

# EUROPEAN PATENT OFFICE

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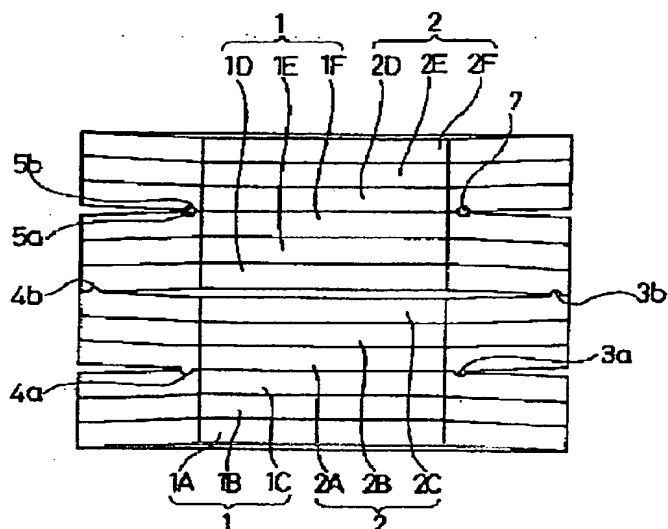
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INVENTOR : KAWASAKI KOJI;

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TITLE : BELLEVILLE SPRING TRAIN



**ABSTRACT :** PROBLEM TO BE SOLVED: To provide an improved spring for preventing lateral deviation of a conical belleville spring train to be incorporated in a main spindle to obtain tool lifting force of the main spindle of a machining center.

**SOLUTION:** Annular projecting parts 4a are formed on one side near the contact parts on the center sides of belleville springs 1C, 2A whose conical surfaces are stacked into a reverse X shape, annular recessed parts 3a are formed on the other side facing it, and they are fitted to each other. In the case of belleville springs 1F, 2D, annular recessed parts 5a, 5b are formed on both sides, and a ring 7 is interposed and fitted. In belleville springs 2C, 1D stacked into an O shape, annular projecting parts 4b are formed on one side near the outer edge contact part, annular recessed parts 3b are formed on the other side facing it, and they are fitted to each other. Therefore, lateral deviation is prevented even if the conical surfaces are stacked in the opposite directions.

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